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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/509,295	08/30/2005	Jas Pal Badyal	42965-P040US	2218

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EXAMINER	
LIGHTFOOT, ELENA TSOY	

ART UNIT	PAPER NUMBER
1715	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/509,295	BADYAL ET AL.	
	Examiner	Art Unit	
	ELENA Tsoy LIGHTFOOT	1715	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 August 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *23 September 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *8/5/2010*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Withdrawal from Issue

The application (being assigned Patent 7,781,021) has been withdrawn from issue on August 9, 2010 upon granting the applicants' petition filed on August 5, 2010 under 37 CFR 1.313(c)(2) to withdraw the application from issue after payment of the issue fee.

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after payment of the issue fee. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, prosecution in this application has been reopened pursuant to 37 CFR 1.114. Applicant's submission filed on August 5, 2010 has been entered.

Information Disclosure Statement, Issue Fee Paid

Applicant's information disclosure statement of August 5, 2010 was filed after the issue fee was paid. The information disclosure statement has been considered upon withdrawal of the application from issue under 37 CFR 1.313(c)(1).

Status of the Claims

Claims 1-21 are pending in the application. Species II of applying a polymer material coating by spraying or atomization were elected in the Response filed on June 24, 2009. Species I, III and IV have been withdrawn from consideration as directed to a non-elected species.

Claims examined on the merits are 1-21.

Examiner Note

In the absence of definition of the term "atomization" in the Applicants' specification, the limitation "applied by atomization" in claim 2 was broadly interpreted as applied by chemical vapor deposition (CVD) such as plasma deposition or ion beam deposition, etc., because *vapor* of a precursor in a CVD vacuum chamber is generally in a state of separate molecules, i.e. atomized state.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 18-21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 18 recites in lines 4-5 a limitation "applying a coating to the substrate surface, said coating being formed from a polymer of which the outer layer includes unsaturated bonds", which renders the claim indefinite because it is not clear how the (single) polymer coating layer has the "outer layer". For examining purposes the phrase was interpreted as "applying a coating

to the substrate surface, said coating being formed from a polymer, the outer surface of which coating ~~the outer layer~~ includes unsaturated bonds".

Claim Objections

3. Claim 20 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 20 recites "the selective pattern of fluorination" whereas claim 19 on which it depends recites fluorination of a whole area. For examining purposes claim 20 was interpreted as depending on claim 18.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1, 3-6, 8 and 15-17 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Soga et al (US 5,238,746).

Examiner Note: in the absence of definition of the term "fluorinating', the term was given the broadest reasonable interpretation: e.g. as applying a curable coating of fluorine containing molecules to a surface of a curable polymer coating since claim 13 recites that fluorination may be achieved by exposure to molecular fluorine containing species.

Soga et al discloses a method of applying a coating to a surface of a substrate, the method comprising applying to a substrate surface a solution of a silane in an organic solvent (claimed blend) by *dipping* (See column 3, lines 34-46) to form inner polysiloxane layer 2 containing unsaturated bonds such as C=C bonds (claimed step (i) of applying a polymer material); spray coating (See column 8, lines 23-34) a solution or suspension of fluorine-based polymer molecule (See column , lines) a fluorine-based coating film 3 containing unsaturated bonds such as C=C bonds (claimed fluorinating step (ii)) (See Fig. 1); irradiating the coatings with an electron beam, corona treatment, a neutron beam, alpha rays, beta rays and gamma rays (See column 6, lines 15-18) to cause breakage of C=C bonds in the inner layer 2 and those in the fluorine-based coating film 3, such as shown in Fig. 2, thus forming chemical bonds between the inner layer 2' and fluorine-based coating film 3' (claimed curing step (iii)) (See column 5, lines 62-68).

7. Claims 1-8, 12 and 14-17 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Veerasamy et al (US 6280834).

Veerasamy et al discloses a method of applying a coating to a surface of a substrate, the method comprising applying to the substrate 10 **at least one** diamond-like carbon (DLC) inclusive layer 11 (claimed additional layers as required by claim 12) (See Fig. 1(a)) by an ion beam deposition technique utilizing a C_2H_2 (acetylene) (claimed step (i) of applying a polymer material); surface **plasma** treating the DLC inclusive coating 11 with (fluorine) **F** atoms (claimed step (ii) of fluorinating the surface of the polymer material) for the purpose of increasing the coating system's hydrophobic qualities (See column 9, lines 22-27; column 13,

lines 29-33); applying to the at least one DLC inclusive layer 11 **at least one** fluoro-alkyl silane (FAS) inclusive layer 12 (claimed step (ii) of fluorinating the surface of the polymer material); heating the *entire coated substrate* (See column 6, lines 1-4) to thermally **cure** the coatings (claimed curing step (iii)) thereby improving bonding characteristics of the FAS inclusive layer to the DLC inclusive layer (See Fig. 1(a); Abstract; column 5, lines 40-51; column 6, lines 45-52).

As to claims 2-4, the DLC inclusive layer is deposited using an ion beam deposition technique utilizing a C_2H_2 (acetylene) (claimed chemical vapor deposition of homopolymers) (See column 7, lines 29-32). It is the Examiner's position that the ion beam deposition technique of Veerasamy et al reads on claimed atomization since the Applicants' specification does not provide definition of the term.

As to claim 6, It is the Examiner's position that the DLC inclusive layer is deposited using an ion beam deposition technique utilizing a C_2H_2 (acetylene), includes crosslinkable unsaturated bonds because Veerasamy et al teaches that the deposited layer is cured by heat.

As to claim 7, the DLC layer may include in addition to the carbon atoms of the sp^3 carbon-carbon bonds, by atomic percentage, from about 0-20% oxygen (O) (See column 9, lines 7-13).

As to claim 9, limitation of claim 9 is not addressed as being *optional*.

As to claim 17, It is the Examiner's position that controlling temperature of the DLC layer is implied because Veerasamy et al teaches the separate step of heating the applied coatings.

8. Claims 1-8, 12 and 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liu et al (US 6849304) in view of Veerasamy et al '834.

Liu et al discloses a method of applying a coating to a surface of a substrate such as optical or magnetic substrate, the method comprising applying a solution of unsaturated fluoroalkylether lubricant (See column 6, lines 1-18) to a protective carbon overcoat of a magnetic recording disc (See column 6, lines 18-34); heating the magnetic recording disc from about 50°C to about 150 °C and exposing the lubricant to UV radiation to cure the fluoroalkylether lubricant (See Abstract; column 6, lines 42-50) thereby forming a lubricant layer *bonded* to the carbon overcoat, thus affording improved protection and less lubricant spin-off from the media (See column 3, lines 42-46).

As to claimed step (i) of applying a polymer material, Liu et al teaches that a magnetic medium as used in computer-related application, comprises a non-magnetic disk-shaped substrate, e.g., of **glass**, ceramic, glass-ceramic composite, polymer, metal, or metal alloy, together with a plurality of thin film layers including a protective overcoat layer, *typically* of a carbon (C)-based material, e.g., diamond-like carbon ("DLC") having good tribological properties (See column 1, lines 12-33). The protective carbon overcoat can comprise one or more layers of carbon, e.g. hydrogenated amorphous carbon or nitrogenated amorphous carbon (See column 4, lines 52-57).

However, Liu et al fails to teach that the DLC layer is formed as a homopolymer or copolymer material by chemical vapor deposition (Claims 1-3).

Veerasamy et al teaches that a diamond-like carbon (DLC) inclusive layer 11 may be deposited on a glass substrate by an ion beam deposition technique (utilizing a C_2H_2 (acetylene)

(claimed step (i) of applying a polymer material by chemical vapor deposition) *which upon heating* at 70°C-200°C, preferably at 70°C-100°C (See column 6, lines 7-11) with fluoro-alkyl silane (FAS) inclusive layer 12 subsequently applied to the DLC inclusive layer (See column 6, lines 1-4) thermally cures with *improved bonding* characteristics to the FAS inclusive layer (See Fig. 1(a); Abstract; column 5, lines 40-51).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have formed the DLC layer in Liu et al by an ion beam deposition technique utilizing a C_2H_2 with the expectation of providing the desired *improved bonding* of the DLC layer to the adjacent fluoro-containing layer upon heating at 70°C-100°C, as taught by Veerasamy et al.

As to claims 2-4, Veerasamy et al teaches that the DLC inclusive layer is deposited using an ion beam deposition technique utilizing a C_2H_2 (acetylene) (claimed chemical vapor deposition of homopolymers) (See column 7, lines 29-32). It is the Examiner's position that the ion beam deposition technique of Veerasamy et al reads on claimed atomization since the Applicants' specification does not provide definition of the term.

As to claims 6-7, It is the Examiner's position that the DLC inclusive layer of Veerasamy et al deposited using an ion beam deposition technique utilizing a C_2H_2 (acetylene), includes crosslinkable unsaturated bonds because Veerasamy et al teaches that the deposited layer is cured by heat.

9. Claims 1-8 and 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Badyal et al (US 6358569) in view of Veerasamy et al '834.

Badyal et al discloses a method of applying a coating to a surface of a substrate, the method comprising exposing the substrate to cold plasma polymerisation to form an adherent layer of unsaturated carboxylic (e.g. acrylic) acid polymer on the surface and then derivatising the polymer by cold plasma using SF_6 (See column 6, lines 12-15) to attach a perfluoroalkyl group terminating in $--CF_3$ trifluoromethyl (See column 1, lines 27-36).

Thus, Badyal et al discloses claimed steps (i) and (ii) except for the curing step (iii).

Veerasamy et al teaches that heating a layer deposited by CVD of acetylene (i.e. carbonaceous unsaturated compound) together with a CVD deposited fluorine-containing layer thermally **cures** the layers (claimed curing step (iii)) thereby improving bonding characteristics of the CVD deposited fluorine-containing layer to the carbonaceous layer deposited by CVD of the unsaturated compound (See Fig. 1(a); Abstract; column 5, lines 40-51; column 6, lines 45-52).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have heated the acrylic acid polymer layer together with a CVD deposited fluorine-containing layer in Badyal et al with the expectation of providing the desired improved bonding characteristics of the CVD deposited fluorine-containing layer to the acrylic acid polymer (i.e. to the carbonaceous layer deposited by CVD of the unsaturated compound) by thermal curing the layers, as taught by Veerasamy et al.

As to claim 2, It is the Examiner's position that the plasma deposition technique of Badyal et al reads on claimed atomization since the Applicants' specification does not provide definition of the term.

As to claim 7, Badyal et al teaches that the acrylic acid polymer is deposited using acrylic monomer and gas (See column 4, lines 8-12).

10. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Soga et al '746.

Soga et al teaches in Examples 1 and 8 that a silane solution of layer 2 may be applied by *dipping* and a suspension of layer 3 may be applied by *spraying* (See column 8, lines 16-25; column 9, lines 19-26). However, since spraying is a technique that is conventionally used in the art for applying a liquid coating to a substrate, and since Soga et al does not limit its teaching to dipping technique, it would be obvious to one of ordinary skill in the art at to apply the silane solution by spraying.

11. Claims 8-11 and 13-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liu et al '304 in view of Veerasamy et al '834 or over Badyal et al '569 in view of Veerasamy et al '834, as applied above, and further in view of Stirniman et al (US 6589641).

Liu et al in view of Veerasamy et al fails to teach forming selectively crosslinked portions and selectively uncrosslinked portions of the fluorine-containing layer (Claims 8-10, 13) in a pattern (Claims 11, 18).

However, Stirniman et al teaches that a lubricant topcoat can be cured through a mask to obtain crosslinked portions only on a landing area (See column 8, lines 62-67).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have formed a lubricant film of crosslinked fluoropolymer in Liu et al in view of Veerasamy et al by pattern crosslinking of the applied fluoropolymer coating, with the expectation of providing the desired magnetic recording medium having a lubricant topcoat only on potions of the substrate, e.g. on a landing area, as taught by Stirniman et al.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have formed a fluorine-containing layer in Badyal et al in view of Veerasamy et al by pattern crosslinking of the applied fluorine-containing layer, with the expectation of providing the desired pattern having fluorine-containing layer only on potions of the substrate, as taught by Stirniman et al, depending on particular use of a final product.

As to claim 14, Liu et al fails to teach the use of plasma for generating fluorinating species. However, Veerasamy et al teaches that **plasma** treating the DLC layer with (fluorine) **F** atoms before applying fluoro-alkyl silane layer increases the coating system's hydrophobic qualities (See column 9, lines 22-27; column 13, lines 29-33).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have plasma treated the DLC layer in the cited prior art with (fluorine) F atoms before applying fluoroalkylether lubricant layer with the expectation of providing the desired increased coating system's hydrophobic qualities, as taught by Veerasamy et al.

As to claims 20-21, Stirniman et al teaches the selective crosslinking to vary the location of the crosslinked polymer layer can be accomplished using a mask (**claimed spacially resolved means**) to block the crosslinking radiation, such as *ultraviolet light or electron bombardment* (See column 8, lines 39-42), from striking portions of the substrate (See column 8, lines 55-57).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ELENA Tsoy LIGHTFOOT whose telephone number is (571)272-1429. The examiner can normally be reached on Monday-Friday, 9:00AM - 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on 571-272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Elena Tsoy Lightfoot, Ph.D.
Primary Examiner
Art Unit 1715

August 16, 2010

/Elena Tsoy Lightfoot/